Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

TITLE V DRAFT PERMIT: NO. V-05-070
EAST KENTUCKY POWER COOPERATIVE, INC.
J.K. SMITH GENERATING STATION
CLARK COUNTY, KY.
DECEMBER 20, 2005
TIMOTHY J. RUST, REVIEWER
SOURCE I.D.: 21-0049-0027
SOURCE A.I. #: 808
ACTIVITY #: APE20050002

CURRENT PERMITTING ACTION-INITIAL SOURCE WIDE TITLE V PERMIT

East Kentucky Power Cooperative, Inc. is an existing source with natural gas fired peaking units for electricity generation at the J.K. Smith Generating Station in Clark County, Kentucky. The source has two operating permits that have undergone public and U.S.EPA review (01-07-1993 and 06-13-2001 respectively), however, the final Title V permits were not issued. The first construction-operating permit was issued on March 24, 1993 (C-93-045) for the construction and operation of five simple cycle combustion turbines. Three (3) ABB GT 11N2 and one (1) General Electric EA7 combustion turbines were constructed and are currently being operated. The second prevention of significant deterioration (PSD) construction/operating permit was issued on July 27, 2001 (V-01-004) for the additional construction and operation of three (3) General Electric 7EA combustion turbines. The seven total units are each capable of burning both natural gas (more than 90% of the time) or #2 fuel oil (less than 10% of the time) and are all currently in commercial operation. A Title V Permit application for emission units 1-4 (combustion turbines SCT 1, SCT 2, SCT 3, and SCT 4) received on June 29, 1999 was called administratively complete on August 28, 1999 but has not been drafted or issued. A Phase II acid rain application for the emission units 1-4 (combustion turbines SCT 1, SCT 2, SCT 3, and SCT 4) received on May 17, 2000 has not been drafted or issued. The Phase II acid rain application for emission units 5-7 (combustion turbines SCT 5, SCT 6, and SCT 7) received on March 7, 2000 was also not drafted or issued along with the issuance of the PSD permit (V-01-004) for those units.

The Division will issue a source-wide proposed permit to incorporate the construction permit, PSD permit, draft Phase II Acid Rain and draft NOx Budget permits for all combustion turbines (CTs). Given the details stated above, the Phase II Acid Rain and the NOx Budget permit sections of the permit will have the draft watermark to indicate that the public has not reviewed this portion of the combined permits. The new facility permit number V-05-070, will consolidate the authority of any previously issued construction, PSD permit terms and conditions for the various emission units and incorporate all requirements of those existing permits into one single permit for this source. For continuity, the most current log number and the completeness dates will be used as general numbers for this permit.

APPLICABLE REGULATIONS:

401 KAR 51:017	Prevention of significant deterioration of air quality
401 KAR 51:160	NO_x requirements for large utility and industrial boilers, incorporating by reference 40 CFR Part 96
401 KAR 52:060	Acid rain permits, incorporating by reference 40 CFR Parts 72 to 78
401 KAR 60:005	New Source Performance Standards, incorporating by reference 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines, for emissions unit with a heat input at peak load equal to or greater than 10 mmBtu/hour for which construction commenced after October 3, 1977, and 40 CFR 60, Subpart A, General Provisions.
401 KAR 63:020	Potentially hazardous matter or toxic substances
401 KAR 63:021	Existing Sources emitting toxic air pollutants
40 CFR Part 75	Continuous Emission Monitoring (CEM)

No units have applicable NO_x limits set by 40 CFR Part 76.

COMMENTS:

EMISSION UNITS 01-04

Pursuant to 401 KAR 60:005, incorporating by reference 40 CFR 60.332, and 401 KAR 51:017, the maximum concentration of NO_x shall not exceed 25 ppmdv @ 15% O_2, while burning natural gas, and 42 ppmdv @ 15% O_2, while burning number two fuel oil, in any one-hour average, except during the start-up, shut-down, or malfunction periods. Compliance shall be assured by following the alternate method approved in 40 CFR 75, in lieu of a water-to-fuel monitoring system or using a CEMS. Compliance with 40 CFR 75 Appendix E shall assure compliance with 40 CFR 60 Subpart GG.

Pursuant to 401 KAR 60:005, incorporating by reference 40 CFR 60.333, and 401 KAR 51:017, the emissions of SO_2 shall not exceed 500 pounds per hour for each turbine respectively and 2500 tons per year during any consecutive twelve (12) month total for all turbines. For compliance with the SO_2 emission limits, the fuel sulfur content due to the firing of pipeline quality natural gas shall not exceed 2.0 grains/1000 dscf, and low sulfur number two fuel oil shall not exceed 0.05% sulfur by weight. The permittee, additionally, shall monitor the total sulfur content of the fuel being fired in each of the turbines.

Pursuant to 401 KAR 51:017, except during periods of startup, shutdown, or malfunction, the carbon monoxide emissions level in the exhaust gas for each turbine shall not exceed 75 pounds per hour each based on a three (3) hour average, and 375 tons per year during any consecutive twelve (12) month total for all turbines. For compliance with the CO emission limits, the permittee shall use the formula calculation provided in the permit conditions.

Pursuant to 40 CFR 60.334(h)(4), for which a custom fuel monitoring schedule has been approved, the owner or operator may continue monitoring on this schedule. Therefore, according to the current custom monitoring schedule, the sulfur content of the fuel shall be determined twice per annum. This monitoring shall be conducted during the first and third quarters of each calendar year.

For compliance with the hourly rate limit on the combustion turbines and the type of fuel fired in the turbine, the permittee shall monitor and record the hours of operation and the usage rate and type of fuel from each combustion turbine.

The permittee has completed all initial performance tests required by 40 CFR 60, Standards of performance for new stationary sources (NSPS). The turbines have not been operated to maximum capacity. Due to the low utilization of the units, no additional stack testing will be required during the life of this permit unless there are deviations from the permit requirements, at which time stack tests may be required to demonstrate compliance. The permittee shall monitor, record, and report all applicable requirements for each unit, pursuant to 40 CFR 60, Subpart GG.

EMISSION UNITS 05-07

Pursuant to 401 KAR 51:017, the maximum concentration of CO shall not exceed 25 ppm while firing on natural gas and 61 ppm @ 15% O_2 while firing on number two fuel oil, during any three-hour average excluding startup, shutdown, or malfunction periods. The maximum concentration of NO_x shall not exceed 12 ppmdv @ 15% O_2 while firing on natural gas and 42 ppmdv @ 15% O_2 while firing on number two fuel oil, during any one-hour average, excluding start-up, shut-down, or malfunction periods. For compliance with the CO and NO_x emission limits, the permittee will monitor emission by CEMS that meet the requirements of 40 CFR 60, Subpart GG, and 40 CFR 75.

Pursuant to 40 CFR 60.333, the fuel sulfur content due to the firing of pipeline quality natural gas shall not exceed 2.0 grains/1000 dscf of natural gas and the fuel sulfur content due to firing number two fuel oil shall not exceed 0.05 percent by weight. For compliance with the SO_2 emission limits, the permittee shall monitor the total sulfur content of the fuel being fired in the turbines.

Pursuant to 40 CFR 60.334(h)(4), for which a custom fuel monitoring schedule has been approved, the owner or operator may continue monitoring on this schedule. Therefore, according to the current custom monitoring schedule, the sulfur content of the fuel shall be determined twice per annum. This monitoring shall be conducted during the first and third quarters of each calendar year.

For compliance with the hourly rate limit on the combustion turbines and the type of fuel fired in the turbine, the permittee shall monitor and record the hours of operation and the usage rate and type of fuel from each combustion turbine.

The permittee has completed all initial performance tests required by 40 CFR 60, Standards of performance for new stationary sources (NSPS). The turbines have not been operated to maximum capacity. Due to the low utilization of the units, no additional stack testing will be required during the life of this permit unless there are deviations from the permit requirements, at which time stack tests may be required to demonstrate compliance. The permittee shall monitor, record, and report all applicable requirements for each unit, pursuant to 40 CFR 60, Subpart GG.

EMISSION AND OPERATING CAPS DESCRIPTION:

The Permittee shall not operate combustion turbine units 04, 05, 06, and 07 below 90% load, except during periods of startup and shutdown. Each combustion turbine shall be fired on natural gas not less than 90% of the actual operation hours, and # 2 fuel oil not more than 10% of the actual operating hours during any consecutive 12- month period. Startup shall be defined as going from 0% load up to or above 90% load and shutdown means going from operating load down to 0% load. Elapsed time during each startup or shutdown for each combustion turbine shall not exceed two (2) hours. Each combustion turbine shall not start up or shut down more than 200 times per year. The actual operation hours for emission units 01-04 shall not exceed 2500 hours each during any consecutive 12-month period.

The source will assure compliance for each pollutant with use of continuous emission monitors, approved alternative methods, and calculation procedures based on EPA methods to convert combustion turbine monitored concentrations to mass per unit time emission levels. In addition, there will be weekly monitoring of the hours of operation of each combustion turbine along with the usage rate and type of fuel combusted during that time.

Emissions are estimated to be less than 10 tons/year of any single hazardous air pollutant (HAP), and less than 25 tons/year of any combination of HAPs. The permittee will ensure compliance by calculating HAP emissions, tracking and totaling emissions, and by assuring Title V thresholds are not exceeded. A stack test for formaldehyde will not be required.

CONTROL DEVICE REQUIREMENT:

The permittee will determine SO_2 emissions by using the heat input calculated using a certified flow monitoring system, and a certified diluent monitor, in conjunction with the default SO_2 emission rate for pipeline natural gas from Section 2.3.3 of Appendix D and equation F-23 in Appendix F as specified in 40 CFR Part 75. The permittee will assure continuing compliance with the nitrogen oxide standard using approved alternative methods, or CEM data as an indicator as described in the permit. All turbines are equipped with water injection for nitrogen oxide (NO_x) emission control.

SUMMARY WRITEUP FOR EMISSION UNITS 05 – 07, WHICH RECIEVED A PSD PERMIT V-01-004 ISSUED 07/27/2001 WITHOUT AN ACID RAIN PERMIT

Emission Units 05-07: Natural gas-fired simple cycle combustion turbine with low water injection; constructed April 2001

East Kentucky Power Cooperative, Inc. is proposing to construct and operate three (3) simple cycle combustion turbines at their existing J.K. Smith site located in Clark County, Kentucky. This site currently has three simple cycle combustion turbines, with a fourth under construction. East Kentucky Power Cooperative plans to add three (3) General Electric 7EA combustion turbines each capable of burning either natural gas or #2 fuel oil. This project is considered a major stationary source and it is subject to a Prevention of Significant Deterioration (PSD) review. In addition, the turbines are subject to the New Source Performance Standards (NSPS) for NO_X and SO_2 since the heat input is greater than 10.0 mmBtu/hour. Emissions of beryllium, cadmium, chromium, copper, formaldehyde, lead, manganese, nickel, sulfuric acid and mercury are subject to 401 KAR 63:020, Potentially hazardous matter or toxic substances.

The permit and source will be a PSD source since potential emissions of particulate, nitrogen oxide (NO_X) and sulfur dioxide (SO_2) each are greater than 250 tons per year. The permittee will use 90% natural gas and only 10% # 2 fuel oil. The source will assure compliance for each pollutant with use of continuous emission monitors and a calculation procedure based on EPA methods to convert combustion turbine monitored concentrations to mass per unit time emission levels. In addition, there will be weekly monitoring of the hours of operation of each combustion turbine. Pursuant to 40 CFR 60.333, the permittee shall not cause or discharge into the atmosphere any gases which contain sulfur dioxide in excess of 0.015 percent by volume at 15 percent oxygen on a dry basis or not burn any fuel which contains sulfur in excess of 0.8 percent by weight.

Emissions are estimated to be less than 10 tons/year of any single hazardous air pollutant (HAP), and less than 25 tons/year of any combination of HAPs. The permittee will ensure compliance by calculating HAP emissions, tracking and totaling emissions, and by assuring Title V thresholds are not exceeded. Since the total emissions of formaldehyde including those from the existing gas turbines are less than 10 tons/year, a stack test for formaldehyde will not be required.

A preliminary/final determination was made to approve the permit and a public notice was placed in The Winchester Sun on June 13, 2001, and issued PSD final permit on July 27, 2001.

SUMMARY WRITEUP FOR CONSTRUCTION PERMIT C-93-045 ISSUED 03/24/93 FOR UNITS 01 – 04, WHICH NEVER RECIVED A TITILE V PERMIT

Units 01-04: Natural gas-fired simple cycle combustion turbine with low water injection

On November 19, 1992, the Kentucky Division for Air Quality received a complete application from the East Kentucky Power Cooperative (EKPC) for the construction of up to five, #2 fuel oil/natural gas fired, simple cycle combustion turbines. Each unit will have a maximum heat input of 1492 mmBtu/hour and will be used to meet the power supply of the system's peak load requirements. A Prevention of Significant Deterioration (PSD) review applies since the modification is major and there will be a significant net emissions increase for sulfur dioxide (SO_2), nitrogen oxides (NOx), total suspended particulate (PM/PM_{10}), carbon monoxide (CO), beryllium (Be), sulfuric acid mist (H_2SO_4), and volatile organic compounds (VOC). Additionally, this proposal is subject to the New Source Performance Standards (NSPS) for NOx and SO_2 since the heat input is greater than 10.0 mmBtu/hour.

The review of the application demonstrated that the Best Available Control Technology (BACT) has been proposed for the control of sulfur dioxide, nitrogen oxides, total suspended particulate, carbon monoxide, beryllium, and volatile organic compounds. Results of the air quality modeling analyses indicated that the maximum predicted concentration of each pollutant was less than the respective allowable PSD increment. The National Ambient Air Quality Standard (NAAQS) is predicted to be exceeded for SO_2 emissions. However, a detailed modeling analysis indicated that the proposed construction of the turbines would not have a significant impact on the modeled exceedances of sulfur dioxide.

A preliminary determination was made to approve the permit and a public notice was placed in The Winchester Sun on January 7, 1992.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.